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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/784,055

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Robert E. Buxbaum

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EXAMINER

WARTALOWICZ, PAUL A

ART UNIT

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/784,055	Applicant(s) BUXBAUM, ROBERT E.	
	Examiner PAUL A. WARTALOWICZ	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-22, 24, 25 and 27-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-22, 24, 25 and 27-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 2/12/10 have been fully considered but they are not persuasive.

Applicant argues that Towler teaches away from using a hydrogen purification membrane for the final purification of hydrogen for subsequent use with a fuel cell, such as a PEM membrane, as in the claims.

However, it appears that Autenrieth uses a similar PEM membrane (col. 8, lines 27-33). It appears that Autenrieth avoids drying out the PEM membrane by providing water to the PEM membrane (col. 2, lines 15-25; col. 5, lines 8-25). Therefore, it appears that Towler does not teach away from having a membrane for hydrogen separation before introducing the hydrogen stream to the PEM membrane fuel cell.

Additionally, Towler does not disparage the system of Autenrieth or the invention as Autenrieth provides water to the cathode side of the fuel cell and because the fuel cell of Autenrieth can be a PEM membrane fuel cell. One of ordinary skill reading Towler and Autenrieth would understand that water should be present in the PEM fuel cell to prevent drying not that the water has to enter the PEM fuel cell with hydrogen necessarily. Autenrieth provides water to the PEM fuel cell separate from the hydrogen.

Applicant argues that Thompson teaches regulating the pressure immediately upstream of the membranes and that, in contrast, the sensor control of claim 28 adjusts

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the rate of feedstock entering the upstream reformer in response to the downstream requirements of a fuel cell.

However, the recitation in Thompson relied upon in the rejection states that "the control system...is...adapted to receive a...signal...corresponding to...monitored pressure...of product fluid...to transport a corresponding output signal to said additional control means for adjusting the operation of said additional control means for adjusting the operation...to increase or decrease the flow rate...of the fluid mixture in said fluid inlet means..." (col. 3, lines 30-50). This appears to teach, in essence, adjusting the flow rate of an inlet stream based upon pressure readings of the product stream (purified hydrogen side).

Applicant's argument regarding the sensor of the instant claim being used to adjust the rate "in response to the downstream requirements of a fuel cell" does not appear to be commensurate in scope because the claim does not require adjusting the rate of feedstock "in response to the downstream requirements of a fuel cell."

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "in response to the downstream requirements of a fuel cell") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Additionally, applicant argues that Thompson is directed to regulating the pressure immediately upstream of the membranes. However, it appears that Thompson

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is concerned with adjusting the inlet as a result of the product in general. This definition of the product includes a product on a purified hydrogen side of said secondary stage membrane reactor.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 16-22, 24, 25, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Towler et al. (U.S. 6409974) in view of Autenrieth (US 6423435).

Towler teach a process for forming hydrogen from a feedstock (col. 1) wherein a feedstock is heated with a fuel exhaust stream (col. 10) and then is fed to a reformer and an endothermic product and hydrogen are produced (col. 4, 6) and then fed to a shift reaction zone (col. 7) wherein hydrogen gas and waste gas are produced (col. 8), wherein the waste gas is burned to provide heat to the reformer reaction (col. 8, 9).

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As to the limitation of burning feedstock to said burner to provide heat to the reactor, Towler teach that the burner fuel comprises natural gas, which is the composition of the feedstock (col. 5, 9). This burner fuel is fed to the combustion zone with combustion gas at efficient conditions (col. 6).

Regarding the limitation of said feedstock is preheated within a pump supplied boiler, it appears that this limitation is a product by process limitation. The product in this case is a preheated feedstock. It appears that the preheated feedstock of the prior art is substantially similar as that of the prior art. When the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to the applicant to establish that their product is patentably distinct and not the examiner to show the same process of making. *In re Brown* 173 USPQ 685 and *In re Fessman* 180 USPQ 324.

Regarding the limitation of monitoring the temperature and pressure, Towler teach monitoring temperature (col. 6). Although Towler does not explicitly teach monitoring pressure, one of ordinary skill in the art would be motivated to monitor pressure as Towler teaches monitoring reaction conditions (col. 6).

Regarding the limitation wherein combustible flow gas is provided stoichiometrically to burn raffinate, one of ordinary skill in the art would recognize the advantages of providing stoichiometric amounts of combustible gas such as efficiency and optimization of the reaction between the combustible gas and the raffinate.

Towler fails to teach that hydrogen is passed through a membrane to thereby separate the hydrogen from the raffinate stream after the water gas shift reaction.

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Towler is drawn to a method of purifying a hydrogen stream for use in a fuel cell (col. 1). Holland is also drawn to a method of purifying hydrogen for use in a fuel cell (col. 4, 5).

Autenrieth, however, teaches a method of making hydrogen in a fuel cell system arrangement (col. 1) wherein an effluent from a reformer is sent to a membrane reactor comprising a water gas shift reaction for the purpose of generating additional hydrogen (col. 4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide an effluent from a reformer is sent to a membrane reactor comprising a water gas shift reaction in Towler in order to generate additional hydrogen (col. 4) as taught by Autenrieth.

Claims 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Towler et al. (U.S. 6409974) in view of Autenrieth (US 6423435) and Thompson (US 5281253).

Towler teaches a process as described above in claim 1.

Towler fails to teach modifying the speed of the feedstock entering the reactor in response to sensing a pressure on a purified hydrogen side of secondary stage membrane reactor.

Thompson teaches a method for controlling systems of membranes (col. 1) wherein an inlet to a membrane system is adjusted based upon the pressure of the

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outlet (permeate side) of a membrane system for the purpose of raising or lowering the product pressure as needed (col. 3).

As Thompson teaches an inlet to a membrane system is adjusted based upon the pressure of the outlet (permeate side) of a membrane system for the purpose of raising or lowering the product pressure as needed (col. 3), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to control the speed of the feedstock entering the reactor of Towler in response to the pressure of the hydrogen on the permeate side of the membrane in order to raise or lower the product stream pressure as needed (col. 3).

Regarding claim 30, it appears that Towler teaches that an endothermic reaction takes place in the reactor such that the reactor is an endothermic reactor.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Wartalowicz
June 3, 2010

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/Stanley Silverman/

Supervisory Patent Examiner, AU 1793